

MEANS FOR SAFELY SUPPORTING FRAGILE ARTICLES

This application hereby claims filing priority based upon United States provisional patent application No. _____ filed on _____ on a Support System For Shipping Fragile Articles, currently pending, which was filed by the same applicant as herein, namely, Michael J. Sullivan.

BACKGROUND OF THE INVENTION

1. Field Of The Invention

Various supporting systems have utilized for supporting fragile articles such as glass panels, glass for windows, and other items in a safe manner to prevent damage or breakage thereof. Such fragile articles are often of such a configuration that they are stackable and, as such, are shipped in groups often placed vertically on their edges. The different types of apparatus specifically designed for supporting these fragile articles must be engineered to be particularly structurally strong when used for shipping thereof. Normally, these articles are shipped in stacked groupings while positioned on edge and positioned upon a generally horizontally extending

substrate such as a pallet or the like and, as such, can easily be broken or damaged due during the normal rough handling commonly associated with handling thereof during shipping.

5 The present invention provides a unique improvement in the apparatus used heretofore for supporting such fragile panels or articles for safely during shipment thereof. Contact of the fragile articles with the metallic fasteners used in mounting of the supporting system can
10 seriously damage or break the articles. Even the slightest contact of a glass article or sheet with an embedded metallic fastener such as a staple or screw can cause breakage or start a crack in one or more of the fragile articles. However, with the supporting system set forth
15 herein, these metallic securement devices such as staples which hold the system to the substrate therebelow can maintained spatially distant from the fragile articles mounted upon the support members by defining a safety zone extending therebetween. This separation or safety zone is
20 defined by the driving of the securing staples through a lower lip or ledge defined as the upper securement surface which is positioned substantially lower than the support plane of the upper supporting surface of the support member which receives the fragile articles positioned thereon.

2. Description Of The Prior Art

Other patents which have been granted for the purpose of supporting and protecting of glass panels, or glass sheets or other breakable items during shipment include United States Patent No. 2,086,688 patented July 13, 1937 to G.C. Woodruff on a "Shipping Container" and assigned to The L.C. L. Corporation; and United States Patent No. 2,337,468 patented December 21, 1943 to W. P. Hilger on a "Shipping Container For Breakable Sheets" and assigned to B. H. Flanagan and M. H. O'Link; and United States Patent No. 2,556,529 patented June 12, 1951 to J. A. Farrell on a "Shipping Carton For Glass" and assigned to Cadillac Products, Inc.; and United States Patent No. 2,626,050 patented January 20, 1953 to J. M. Freiberg on a "Folding Shipping Frame For Glass" and assigned to Pittsburgh Plate Glass Company; and United States Patent No. 2,665,804 patented January 12, 1954 to M. C. Koester on a "Shipping Container For Glass Sheets" and assigned to Libbey-Owens-Ford Glass Company; and United States Patent No. 2,695,705 patented November 30, 1954 to H. O. Powers et al on a "Pallet Case" and assigned to Libbey-Owens-Ford Glass Company; and United States Patent No. 2,734,626 patented February 14, 1956 to M. C. Koester et al on a "Shipping Container For Glass Sheets" and assigned to Libbey-Owens-Ford Glass Company; and United States Patent No. 2,738,058 patented March 13, 1956 to R. C. Hansen et al

on a "Pallet Case" and assigned to Libbey-Owens-Ford Glass Company; and United States Patent No. 2,741,362 patented April 10, 1956 to S.E. Cortright on a "Shipping Container For Glass" and assigned to General Motors Corporation; and United States Patent No. 2,873,024 patented February 10, 1959 to M. C. Koester on a "Shipping Container For Glass Sheets" and assigned to Libbey-Owens-Ford Glass Company; and United States Patent No. 3,064,845 patented November 20, 1962 to W. J. Maxwell on a "Shipping Container" and assigned to Pittsburgh Plate Glass Company; and United States Patent No. 3,216,564 patented November 9, 1965 to H. O. Wolfe, Jr. et al on a "Shipping Container" and assigned to Pittsburgh Plate Glass Company; and United States Patent No. 3,389,786 patented June 25, 1968 to E. J. Lidgard on a "Packaging For Frangible Sheets" and assigned to Flotepak Corporation; and United States Patent No. 3,414,124 patented December 3, 1968 to E. J. Lidgard on a "Container For Sheetlike Material" and assigned to Flotepak Corporation; and United States Patent No. 3,709,358 patented January 9, 1973 to B. Andrews et al on "Packages Of Glass In Sheet Form" and assigned to Pilkington Brothers Limited; and United States Patent No. 3,938,660 patented February 17, 1976 to R. J. Moehring on "Glass Sheet Shipping Packages" and assigned to Libbey-Owens-Ford Company; and United States Patent No. 3,939,978 patented to R. J. Thomaswick on February 24, 1976 on a "Flat Glass

Shipping Container" and assigned to PPG Industries, Inc.;
and United States Patent No. 4,014,435 patented March 29,
1977 to J. R. Rowley et al on a "Collapsible Rack For
Shipping And/Or Storing Glass Sheets" and assigned to PPG
Industries, Inc.; and United States Patent No. 4,092,815
patented June 6, 1978 to J. R. Rowley et al on a "Method Of
Loading Glass Sheets On A Collapsible Rack For Storing Or
Shipping" and assigned to PPG Industries, Inc.; and United
States Patent No. 4,225,043 patented September 30, 1980 to
J. P. Lastik on "Securing Pads For Sheet Shipping
Containers"; and United States Patent No. 4,287,990
patented September 8, 1981 to J. F. Kurick on "Glass Sheet
Shipping Packages" and assigned to Libbey-Owens-Ford
Company; and United States Patent No. 4,892,193 patented
January 9, 1990 to G. Thomas on an "Expanded Plastic
Packaging System For Substantially Planar Objects"; and
United States Patent No. 5,085,030 patented February 4,
1992 to T. Segawa et al on a "Method Of Transferring And
Storing Glass Sheets And Tray Used In Method" and assigned
to Nippon Sheet Glass, Co., Ltd.; and United States Patent
No. 5,174,448 patented December 29, 1992 to V. I. Flaig on
a "Container For Shipping And Stacking Sheets Of Glass" and
assigned to Guardian Industries Corp.; and United States
Patent No. 5,632,590 patented May 27, 1997 to T. E. Pearson
et al on a "Method And System For Loading Panels Into
Shipping containers At A Work Station And End Effector For

Use Therein" and assigned to Ford Motor Company; and United States Patent No. 5,678,691 patented October 21, 1997 to M. A. Amado-Aguilar et al on a "Corner Element And A Packing System For The Transportation Of Glass Sheet Packages" and assigned to Vidrio Plano, S.A. De C.V.; and United States Patent No. 6,035,790 patented March 14, 2000 to B. F. Polando on a "Shipping Skid"; and United States Patent No. 6,076,690 patented June 20, 2000 to T. S. Hemmerly on a "Fastener Free Container" and assigned to Concept Packaging Group; and United States Patent No. 6,102,206 patented August 15, 2000 to T. E. Pride on "Packaging For Panels, E.G. Glass Panels" and assigned to Cardinal IG Company; and United States Patent No. 6,158,589 patented December 12, 2000 to J. A. Smith et al on "Boxes With Internal Resilient Elements" and assigned to Motion Design, Inc.; and United States Patent No. 6,305,566 patented October 23, 2001 to M. J. Pigott et al on a "Container For Fragile Articles" and assigned to Nucon Corporation; and United States Patent No. 6,416,271 patented July 9, 2002 to M. J. Pigott et al on a "Drop Box Container" and assigned to Nucon Corporation; and United States Patent No. 6,478,153 patented November 12, 2002 to R. C. King on a "Package For Framed And Unframed Single Mirrors"; and United States Patent No. 6,478,354 patented November 12, 2002 to M. Eyal on a "System And Method For Packing And Transporting Sheet Materials"; and United States Patent No. 6,527,120 patented March 4, 2003

to F. Okamoto on "Containers For Packaging Glass
Substrates" and assigned to Corning Incorporated; and
United States Patent No. 6,536,607 patented March 25, 2003
to P. Knoll et al on a "Transportable Rack" and assigned to
5 Schneider National Inc.; and United States Patent No.
6,539,881 patented April 1, 2003 to S. L. Underbrink et al
on a "Pallet Having A Pallet Deck With A Movable Portion
And An Associated Method" and assigned to The Boeing
Company; and United States Patent No. 6,588,605 patented
10 July 8, 2003 to V. W. Volkert et al on a "Planar Article
Rack Having Closeable Holding Members" and assigned to
Cardinal CG Company; and United States Patent No. 6,591,988
patented July 15, 2003 to P. Trpkovski on "Material
Handling For The Insulating Glass Industry" and assigned to
15 Cardinal Glass Industries, Inc.

SUMMARY OF THE INVENTION

The present invention provides a supporting means
for safely supporting fragile articles with respect to a
substrate therebelow. The supporting means is secured to
20 the substrate by securement devices such as staples driven
therethrough. Preferably this support means provide a
plurality of individual support members organized into an
array and mounting upon the substrate therebelow. Each of
the plurality of support members are oriented extending

longitudinally with respect to one another and are preferably made of a flexibly resilient fiberboard material of medium density. These individual support members are adapted to be positioned upon a substrate therebelow for mounting of the fragile articles thereabove. Each support member can include a main body of flexibly resilient fiberboard material with an upper supporting surface positioned on the main body and defining a support plane extending generally horizontally thereacross for supporting fragile articles thereupon. The upper supporting surface is adapted to support fragile articles thereabove in spaced relation to the substrate therebelow to facilitate protection from breaking or damaging. The support member also includes a lower supporting surface positioned spatially distant from and below the upper supporting surface and extending generally parallel with respect thereto. This lower supporting surface is preferably adapted to abut a substrate located therebelow to facilitate mounting thereupon.

The support member further, preferably, but optionally, includes an upper panel of plastic or other material extending over the upper portion of the main body for defining the upper supporting surface to facilitate moving and supporting of fragile articles therealong while in abutment therewith. This upper panel will be of a dissimilar material from the flexibly resilient medium

density fiberboard of the main body and can be formed of a paper or wax coated paper sheeting or can be made of more slippery materials such as Mylar or the like.

5 The supporting means of the present invention further includes a mounting member preferably integrally configured with respect to the support member and extending longitudinally therealong. This mounting member is preferably securable with respect to the substrate in abutment therebeneath for facilitating attachment of the support member also relative thereto. Each mounting member
10 preferably includes a lower securement surface positionable in abutment with respect to the substrate therebelow responsive to positioning of the lower supporting surface of the support member into abutment with respect to the substrate. Preferably the mounting member also includes an
15 upper securement surface extending generally horizontally and located at a position laterally adjacent and below the upper supporting surface of the support member and positioned spaced from and above the lower securement
20 surface. The upper securement surface preferably defines a securement plane extending generally horizontally which is positioned spaced below the support plane and extending generally parallel with respect thereto. The upper
25 securement surface preferably extends generally parallel to and above the lower securement surface. Also the lower supporting surface and the lower securement surface are

preferably coplanar and integrally formed with respect to one another.

5 The upper securement surface is adapted to receive a securement device such as a staple or the like driven therethrough into engagement with the substrate therebelow to preferably facilitate direct securement of the mounting member to the substrate. This direct securement will attach the support member to the substrate immediately therebelow with the lower supporting surface thereof in direct contact with the substrate positioned therebelow. 10 The upper securement surface preferably defines a safety zone thereabove in the area below the support plane of the upper supporting surface to create spacing therebetween in order to prevent contact between any securement devices extending therethrough and any fragile articles positioned upon the upper support surface. This safety zone means preferably is defined in the area below the support plane and above the securement plane for added safety in preventing abutment between the fragile articles and the mounting staples. 15 20

25 It is an object of the present invention to provide a means for supporting fragile articles wherein said support of fragile articles such as glass panels is performed in a flexibly resilient manner with enhanced safety.

It is an object of the present invention to provide a means for supporting fragile articles wherein the supporting surface thereof can be covered with an upper layer of dissimilar material such as Mylar or the like to prevent sealant from bonding to the medium density fiberboard of the main support means and to facilitate sliding movement of the articles while in contact with the upper supporting surface.

It is an object of the present invention to provide a means for supporting fragile articles of the present invention wherein packing of fragile or glass panels can occur whether under wet or dry conditions and in various orientations.

It is an object of the present invention to provide a means for supporting fragile articles wherein usage with any type of a substrate or skid configuration is made possible.

It is an object of the present invention to provide a means for supporting fragile articles wherein contact between the securing devices such as staples and the supported fragile articles is prevented.

It is an object of the present invention to provide a means for supporting fragile articles mounted upon a substrate therebelow wherein a safety zone is defined for maintaining of safe spacing between the supported fragile articles and the metallic securement

staples.

It is an object of the present invention to provide a means for supporting fragile articles wherein structural support is provided by medium density fiberboard which is flexibly resilient in order to provide a cushioned mounting surface for the fragile articles positioned thereupon.

It is an object of the present invention to provide a means for supporting fragile articles wherein a mounting lip can be provided extending longitudinally along at least one lateral edge of the support means to facilitate direct mounting thereof to the substrate therebelow while simultaneously maintaining the mounting or securement devices separated from the supported fragile articles.

It is an object of the present invention to provide a means for supporting fragile articles being mounted upon a substrate therebelow by securement devices driven therethrough wherein an upper supporting surface is positioned above and distant from an upper securement surface which facilitates attachment of the support means to the substrate therebelow while at the same time minimizing the chance of contact of the supported fragile articles with any portion of the support means other than the medium density fiberboard or friction control coating extending thereover.

It is an object of the present invention to provide a means for supporting fragile articles being mounted upon a substrate therebelow by securement devices driven therethrough which is of minimal cost.

5 It is an object of the present invention to provide a means for supporting fragile articles being mounted upon a substrate therebelow by securement devices driven therethrough which can easily be formed by machining one edge of a single longitudinally extending strip of
10 medium density fiberboard.

BRIEF DESCRIPTION OF THE DRAWINGS

While the invention is particularly pointed out and distinctly claimed in the concluding portions herein, a
15 preferred embodiment is set forth in the following detailed description which may be best understood when read in connection with the accompanying drawings, in which:

Figure 1 is a perspective illustration of an embodiment of the means for supporting fragile articles of
20 the present invention shown mounted upon a substrate pallet with fragile articles positioned thereupon;

Figure 2 is a side cross-sectional view of an embodiment of the means for supporting fragile articles of the present invention showing the safety zone above the

upper securement surface of the mounting member and illustrating the positioning of an upper panel extending across the upper supporting surface in order to provide a friction control layer thereupon and showing a securing staple partially dislodged from the mounting member;

Figure 3 is a side cross-sectional view of an embodiment of the means for supporting fragile articles of the present invention shown with a securement driving means such as a stapling device in position to drive a staple through the mounting member into the substrate therebelow for mounting thereof;

Figure 4 is a side cross-sectional view of an embodiment of the present invention showing a staple operatively securing the mounting member to the pallet substrate therebelow in order to firmly attach the support member relative to the substrate therebelow;

Figure 5 is a side cross-sectional view of an alternative embodiment of the means for supporting fragile articles of the present invention showing a slot defined centrally therein which defines the upper securement surface centrally;

Figure 6 is another alternative embodiment of the means for supporting fragile articles of the present invention showing a longitudinal slot or lip extending along both lateral edges thereof to define a double shoulder cross-section; and

Figure 7 is a side cross-sectional view of one or more glass panels shown positioned upon an array of individual support means for jointly supporting fragile articles of the present invention thereupon while the array is mounted upon a pallet.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

The present invention provides a system for safely supporting fragile articles above a substrate pallet which is particularly usable positioned within shipping containers. The supporting system disclosed herein can be used in or with any of many different types of shipping container devices. It is particularly usable for supporting fragile articles or breakable articles such as glass panels or sheets 22 to facilitate shipment or other movement thereof. The present invention provides the means for safely supporting the glass panels 22, and can be utilized secured to substrates 20 such as pallets of many different shapes or configurations. The support system herein can be used with open pallets or enclosed boxing or any types of housing which contain fragile articles confined therewithin to facilitate handling, shipping or storage thereof.

In particular, the present invention includes a means for supporting which is preferably longitudinally

extending and is preferably approximately three inches in width and approximately one-half to seven-sixteenths inches in vertical height. All of these dimensions are subject to reasonable variation while still practicing the basic concept of the invention set forth herein. Specifically, the vertical height and width can vary based upon the particular manner of usage. The longitudinal lengths can vary significantly between six and twelve feet, or any other length which may be desired in order to support specifically configured fragile articles 22 such as glass panels or for use with substrates of various sizes.

In most applications, a plurality of such support means 10 will be positioned upon a substrate generally extending parallel with respect to one another to form a supporting array thereof extending over the upper substrate surface 36. The positioning of one such support means 11 beneath the glass panels 22 is shown best in the perspective illustration in Figure 1.

Each longitudinally extending support means 10 will preferably include a support member 11 having an upper supporting surface 14 upon which the fragile articles 22 will abut when supported thereby. Each support means will also include a lower supporting surface 12 adapted to be positioned upon the upper surface 36 of substrate 20. Each longitudinally extending support means 10 also will include a mounting member 34 which can be shaped like a lip

extending outwardly therefrom laterally. Preferably, the mounting member 34 and the support member 11 will be formed from a single integral piece of medium density fiberboard. Thus when the mounting member 34 is stapled to the substrate 20, then the support member will also be attached thereto. The mounting member 34 will preferably define a lower securement surface 38 therebeneath which is designed to be brought into direct abutment with the upper surface 36 of a substrate 20 for support thereabove and for securement directly thereto. In this manner the support means 10 of the present invention will space the fragile glass panels 22 at a safe distance from the substrate 20 sufficient to yield a comfortable level of protection to prevent breakage or damaging of the fragile articles 22 which can be caused by contacting with the substrate or vibrations thereof when in abutment with the relative hard substrate, which is normally made of a solid material such as wood.

In the preferred configuration of the present invention, each of the longitudinally extending support means 10 of the present invention is made of a medium density fiberboard which is somewhat flexibly resilient and provides some cushioning to the mounting for the glass panels or other fragile articles 22 positioned thereon, while at the same time being strong enough or hard enough to be capable of being machined such as when defining a

longitudinal slot 15 therealong. Preferably, support means 10 are capable of being machined to form a recess extending therealong to define a lip 34, preferably along one edge thereof as shown in Figures 2,3 and 4.

5 The lip or mounting member 34 so formed will define an upper securement surface 16 on the upper surface thereof. This upper securement surface 16 preferably extends generally parallel with respect to the upper supporting surface 14 of the support member 10 and is spaced upwardly therefrom. The forming of the mounting member or lip 34 is achieved preferably by machining the support means 10 in such a manner as to form a recessed ledge or shoulder thereadjacent to facilitate securement to the substrate 20 therebelow in such a manner that the securement screw or staple 18 driven therethrough will not come into contact supported fragile article 22. This recessed surface provides the upper securement surface 16 defined on the mounting member 34 which preferably is defined by the longitudinal slot 15.

15 The vertical spacing between the upper securement surface 16 and the upper supporting surface 14 will define the safety zone means 17 therebetween. This safety zone 17 provides added safety in protecting the supported fragile articles 22 by preventing contact with securement staples 18 driven through the upper securement surface. Also, often such a staple 18 can work loose or be vibrated loose

which would move it slightly upwardly while still being at least partially embedded in the mounting member 34. One of the important aspects of the present invention is to prevent any contact between glass panels 22 and any of the securement staples or screws 18, particularly those extending even partially upwardly from the upper securement surface 38. These securement devices 18 are very hard since they are normally made of metallic material and when embedded in the support means 10 for securing thereof with respect to the substrate 20, they can badly damage the fragile articles 22 if brought into contact therewith.

In a preferred configuration of this invention, staples will usually be used as the securement means 18, and will be driven by a stapling device 32 into the lip 34 through the upper securement surface 16. Each of the staples 18 will travel downwardly as it is being inserted through the upper securement surface 16 to such an extent that it will engage the substrate 20 positioned therebelow. Numerous staples 18 will be driven through each mounting member 34 into the substrate 20 therebelow to firmly secure the mounting member 34 thereto and, also, to securely attached the associated support member 11 with respect thereto.

Preferably, substrate 20 will be a pallet which can be formed of multiple 2x4's or other sizes of wood components which can be assembled to provide an overall

supporting platform or substrate structure. The support members 11 of the present invention are designed to separate the substrate or pallet 20 from any of the glass panels 22 or other fragile articles positioned upon the upper supporting surface 14 thereof for enhancing safety thereof, especially during shipping.

In most applications, the substrate 20 will comprise a pallet with a plurality of horizontally extending parallel members which define the upper substrate surface 36. In accordance with this embodiment of the present invention, preferably, one support means 10 will be secured upon each such parallel member of substrate 20 such that it extends laterally and longitudinally thereupon. In some applications, the substrate 20 can define a solid or continuous floor member in which case each of the support means 10 should also be positioned generally extending parallel with respect to one another longitudinally and spaced apart laterally from one another to form a horizontally extending array thereof.

With this configuration of the present invention, a unique and simple means of installation is provided by allowing a stapling device or gun 32, as shown in Figure 3, to be brought into abutment with respect to the upper securement surface 16 such that a staple 18 can be driven downwardly therefrom through the mounting member or lip 34, and further through the upper substrate surface 36 into the

substrate 20 therebelow in order to directly secure the lower securement surface 38 of mounting member 34 thereto and to, thusly, attach the associated support member 11 with respect thereto. Since the staples 18, which are usually made of metal, are driven only through the upper securement surface 16, they will not come into contact with the fragile articles 22 which are supported at an elevated portion with respect thereto upon said upper supporting surface 14 of the support members 11. Thus, each support member 11 will define an upper supporting surface 14 which is spaced upwardly by a distance equal to the vertical dimension of the safety zone 17 away from the staples 18, each of which will extend downwardly through upper securement surface 16 of mounting lip 34. As such, contact between a glass panel 22 positioned upon the upper supporting surface 14 of the support member 11 and one of the staples 18 embedded in mounting member 34 will be prevented. This spacing is an important aspect of the present invention because such metal staples 18 can easily cause cracking or otherwise fracture any glass panels or plates or other fragile articles 22 with which it is brought into contact.

Furthermore, under some conditions a staple 18 may tend to loosen such that it will raise or pull outwardly slightly due to moisture, temperature differences, vibrations or other causes. Such a protruding embedded

staple can severely damage such fragile articles if brought into contact therewith. The vertical dimension of the safety zone 17, as shown in Figure 2, will be chosen to be of such a significant depth in order that, even such an elevated embedded staple as shown in the Figure 2 embodiment, it will not be capable of contacting the fragile articles 22, thus enhancing the protection thereof especially during shipping. In most situations, if the staple moves vertically to such an extent that it will extend to a height near vertical height of the support plane 40 of upper supporting surface 14, then the staple would become at least partially disengaged from the mounting lip 34 such that it no longer be capable of damaging a fragile article 22 if brought into contact therewith. Thus, the present invention provides a novel overall mounting configuration formed by an array or plurality of support members 11 extending generally parallel to one another, which will minimize contact of glass panels or other fragile articles 22 from contact with any metallic fasteners mounted thereon. Thus, the fragile articles 22 will only contact the upper supporting surfaces 14 of the support member 11 and the flexible resilience of the medium density fiberboard of the main body 44 thereof will provide enhanced protection especially from vibrations commonly experienced during shipping.

Another alternative configuration for the present invention is shown in Figure 6 wherein a double shoulder cross-section 24 is shown. With this construction, a mounting lip 34 is positioned on each opposite lateral edge of the supporting member 11. Another further alternative configuration is shown in Figure 5 wherein a central slot 26 is defined through which staples 18 can be driven. With the Figure 5 construction, portions of the upper supporting surface 14 will be positioned laterally on each side of central slot 26.

It should be appreciated that one of the important aspects of the present invention is in the preferred positioning of the mounting members 34 at the lateral outer edges of the support members 10. This is important because it allows a stapler device 32 to be positioned directly upon the upper securement surface 16 to facilitate driving of staples 18 therethrough more easily. This capability is important because normally such stapling devices 32 are large and bulky and positioning thereof within, for example, a central slot 26 may be somewhat difficult while positioning thereof on the laterally located mounting lips 34 is much easier due to the added lateral space available for providing ease of access to the securement surface 16 when positioned at the outer lateral edge of support means 10. As such, certain larger staple driving mechanisms 32 would be too big to be positioned within a central slot 26

for driving a staple 18 downwardly therewithin. However,
the possibility of a placing the mounting member 34
centrally within the support member 11 is certainly within
contemplation under the present invention, because with
very slim or otherwise small stapling devices, the central
slot configuration shown in Figure 5 could be utilized.

It should further be appreciated that the support
means 10 of the present invention is preferably made from a
fiberboard of medium density. Such fiberboard provides a
flexible resilience or cushioning to the overall
construction of support means 10 which enhances protection
of the fragile glass panels 22, especially from forces of
vibration often encountered during shipping or other
movement. Use of lower density fiberboard would certainly
provide more flexible resilience, however such softer
fiberboard would be much more difficult to machine or mill
in such a manner as to define a mounting lip 34 or slot 26
thereon and thus would be undesirable with the support
system of present invention. Machining of medium density
fiberboard is much easier and much more uniform than
machining of low density fiberboard which also has a
tendency to loose structural integrity during most types of
machining because it is too soft to hold shape. Forming of
the recessed slots 15 in the support means 10 can be
achieved in many ways, however, the use of a rotating
router bit, or the use of a rotating dado blade have both

been found to be effective ways of defining these slots 15 whether they are edge mounted slots to form the laterally positioned mounting lips 34, or centrally mounted slots 26.

One of the important operational parameters of the support member 11 of the present invention is the control of the coefficient of friction of the upper surface thereof. As such, the present invention includes the concept of the securement of an upper mounting surface friction control layer or upper panel 30 which preferably will extend across the entire upper supporting surface 14 in such a manner that any glass panel 22 positioned thereupon will contact the friction control layer rather than the main body 44 of the support member 11. This upper control layer 30 can preferably be laminated, or otherwise attached to the upper supporting surface 14. Upper panel 30 can be formed of a plastic laminate material, a paper material, a wax-coated paper material, or even a Mylar or other low coefficient of friction material. This upper panel 30 can be attached to the fiberboard by adhesive, glue or by any other conventional means. In this manner, the coefficient of friction between the support members 11 and the fragile articles 22 positioned thereupon can be carefully controlled such that the system of the present invention is usable in many different types of applications.

The choice of material for the upper supporting surface 14 of support member 11 can also be important to prevent sealant from bonding to the fiberboard which is a common problem when shipping glass or other similar fragile panels. Also, the process for moving of the fragile articles 22 onto the upper supporting surfaces 14 of the support members 11 must be considered when determining the proper choice for the coefficient of friction of the upper supporting surfaces 14. The use of a very slick surface for the upper panel 30 on support member 11 provides the capability of more easily sliding heavier loads of fragile panels 22 into position within a shipping crate. The use of upper panels 30 of relatively slick materials such as plastic or Mylar allows fragile articles 22 to travel thereover while in abutment therewith with a minimal amount of scuffing, and with the elimination of pressure points which are often caused by such scuffing. In other situations where the fragile articles 22 are to be placed directly downwardly onto the support members 11, the use of a more slick upper surface material on the upper supporting surfaces 14 may not be needed since sliding of fragile articles 22 while in contact with the upper supporting surface 14 thereof would not be an important consideration.

In the preferred configuration, a plurality of support means 10 will be positioned upon the substrate 20 in an orientation extending generally parallel with respect

to one another. The support members 11 thereof will thusly define a supporting array of the upper supporting surfaces 14 positioned adjacent to recessed slots 15 which will greatly facilitate installation by allowing the driving of staples through the recessed mounting lips 34 thereof while at the same time providing easily accessible and safe means for supporting for the glass panels 22 positioned thereupon.

Figure 7 shows a plurality of the support means 10 mounted upon a substrate pallet 20 in an array extending generally parallel to one another to facilitate the supporting of the fragile glass panels 22 thereupon for shipping. The staples 18 are shown in dotted outline driven through each of the upper supporting surfaces 14 of the respective mounting members 34 extending along one lateral edge of each of the members 10 for securement thereof to the substrate 20. Figure 7 shows a most basic embodiment of the support system of the present invention.

It is important that the detailed construction of the longitudinally extending support means 10 of the present invention be appreciated. The support means 10 includes a support member 11 and a mounting member 34 preferably formed from a single integral piece of fiberboard. In the preferred configuration the mounting member 34 is positioned adjacent to the support member 11

and is recessed downwardly therefrom to space the staples 18 from fragile articles 22. Also in the preferred configuration the support member 11 and the mounting member 34 are formed as a single integral member such that securement of the mounting member 34 to the substrate 20 therebelow will also attach the support member 11 to the same substrate. With this configuration the mounting member 34 will define a lower securement surface 38 which will abut the substrate 20 when the mounting member 34 is secured thereto. Similarly the support member 11 will define a lower supporting surface 12 which will be brought into abutment with the substrate 20 when the support means 10 is positioned thereon for holding of fragile articles 22 thereabove. In this manner securement of the mounting member or lip 34 to the substrate 20 will also firmly attach the supporting member 11 thereto. In the preferred configuration the lower securement surface 38 of the mounting member 34 and the lower supporting surface 12 of the support member 11 are formed as a single coplanar and integrally connected surface.

The upper supporting surface 14 of each support member 11 is preferably defined in a horizontally extending support plane 40. In a similar manner the upper securement surface 16 of each mounting member 34 will be defined within a generally horizontally extending surface securement plane 42. It is preferable that the securement

plane 42 be parallel to the support plane 40 but displaced at a significant distance downwardly therefrom. This spacing between the support plane 40 and the securement plane 42 will define the safety zone 17 therebetween. This safety zone provides spacing between fragile articles 22 positioned on the upper supporting surfaces 14 and the securing staples 18 therebelow, which will preferably be driven downwardly through the upper securement surfaces 16 and the mounting members 34 and then through the upper substrate surface 36 in order to be embedded within the substrate or pallet 20 positioned therebelow. The vertical displacement between the upper supporting surface 14 and the upper securement surface 16 allows positioning of the securing fasteners such as staples 18 at a position spatially distant from the fragile articles supported upon the upper supporting surface 14.

In the preferred configuration each support member 11 and the associated mounting member 34 will be formed as a single integral member and be made from medium density fiberboard 28 to facilitate structural integrity thereof to facilitate machining thereof. Preferably, a single integral piece of medium density fiberboard can be routed or otherwise machined or milled to define the longitudinally extending slot 15 therein for defining the mounting member or lip 34. This mounting member 34 can be defined along one lateral edge of the support means 10 as

shown in Figures 2, 3 and 4 or can be defined on both lateral edges to define a double shoulder cross section 24 as shown in Figure 6. Alternatively a central slot 26 can be formed to define the mounting member 34 centrally on the support means 10 as shown best in Figure 5.

The support member 11 of the present invention preferably includes a main body 44 with an upper panel 30 extending across the upper surface thereof to define the upper supporting surface 14. Preferably this upper panel 30 will be formed of a material having a lower coefficient of friction than the coefficient of friction on the surface if defined by the medium density fiberboard material 28 itself. In this manner the flexible resilience of the medium density fiberboard can be used for providing safe flexible resilient support while at the same time allowing a decrease in the coefficient of friction of the contact surface thereof with respect to fragile articles 22 which are often slid across the upper supporting surface 14 while in contact therewith. There are numerous other reasons for controlling the slipperiness or coefficient of friction of the upper supporting surface 14 and this is achieved by laminating or otherwise attaching of upper panels 30 extending across the upper supporting surface 14 which is formed of various materials such as plastic or mylar or paper which may be coated with wax or other materials.

While particular embodiments of this invention have been shown in the drawings and described above, it will be apparent, that many changes may be made in the form, arrangement and positioning of the various elements of the combination. In consideration thereof it should be understood that preferred embodiments of this invention disclosed herein are intended to be illustrative only and not intended to limit the scope of the invention.